

Physical Education

Victorian Certificate of Education Study Design

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Latoya BARTON
The sunset (detail)
from a series of twenty-four
9.0 x 9.0 cm each, oil on board



Tarkan ERTURK
Visage (detail)
201.0 x 170.0 cm
synthetic polymer paint, on cotton duck



Liana RASCHILLA
Teapot from the *Crazy Alice* set
19.0 x 22.0 x 22.0 cm
earthenware, clear glaze, lustres



Nigel BROWN
Untitled physics (detail)
90.0 x 440.0 x 70.0 cm
composition board, steel, loudspeakers,
CD player, amplifier, glass



Kate WOOLLEY
Sarah (detail)
76.0 x 101.5 cm, oil on canvas



Chris ELLIS
Tranquility (detail)
35.0 x 22.5 cm
gelatin silver photograph



Christian HART
Within without (detail)
digital film, 6 minutes



Kristian LUCAS
Me, myself, I and you (detail)
56.0 x 102.0 cm
oil on canvas



Merryn ALLEN
Japanese illusions (detail)
centre back: 74.0 cm, waist (flat): 42.0 cm
polyester cotton



Ping (Irene) VINCENT
Boxes (detail)
colour photograph



James ATKINS
Light cascades (detail)
three works, 32.0 x 32.0 x 5.0 cm each
glass, fluorescent light, metal



Tim JOINER
14 seconds (detail)
digital film, 1.30 minutes



Lucy McNAMARA
Precariously (detail)
156.0 x 61.0 x 61.0 cm
painted wood, oil paint, egg shells, glue, stainless steel wire

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IMPORTANT INFORMATION

Accreditation period

Units 1–4: 2006–2009

The accreditation period commences on 1 January 2006.

Other sources of information

The *VCAA Bulletin* is the only official source of changes to regulations and accredited studies. The *VCAA Bulletin*, including supplements, also regularly includes advice on VCE studies. It is the responsibility of each VCE teacher to refer to each issue of the *VCAA Bulletin*. The *VCAA Bulletin* is sent in hard copy to all VCE providers. It is available on the Victorian Curriculum and Assessment Authority's website at www.vcaa.vic.edu.au

To assist teachers in assessing school-assessed coursework in Units 3 and 4, the Victorian Curriculum and Assessment Authority publishes an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment.

The current year's *VCE and VCAL Administrative Handbook* contains essential information on assessment and other procedures.

VCE providers

Throughout this study design the term 'school' is intended to include both schools and other VCE providers.

Photocopying

VCE schools only may photocopy parts of this study design for use by teachers.

Introduction

RATIONALE

Physical Education examines the biological, physiological, psychological, social and cultural influences on performance and participation in physical activity. Physical Education focuses on the complex interrelationship between motor learning and psychological, biomechanical, physiological and sociological factors that influence physical performances, together with the wider social attitudes to and understanding of physical activity.

A theoretical and practical approach towards physical activity is taken in this study. It provides the means by which theory and practice are integrated. Participation in physical activity and development of performance skills provide opportunities for students to reflect on factors that affect performance and participation in physical activity, as well as improve their own performance.

The study of physical activity is important to the health and wellbeing of Australians. There is increasing evidence that regular, moderate physical activity throughout a person's life is necessary for physical, social and emotional health. There is also increasing evidence of the health risks associated with a lack of physical activity. The current research, focusing on the measurement of physical activity patterns and trends at a national level, has led to the development of National Physical Activity Guidelines for Australians. This provides a benchmark against which individuals and groups can evaluate their patterns of physical activity.

This study design is relevant to students with a wide range of expectations, including those who wish to pursue further formal study at tertiary level or in vocational education and training settings. The study prepares students for such fields as human movement, nursing or physiotherapy, as well as providing valuable knowledge and skills for participating in their own sporting and physical activity pursuits.

AIMS

This study is designed to enable students to:

- understand the social, environmental and biological factors that influence participation in physical activity;
- analyse the processes associated with skill development in the performance of physical activity;

- examine the relationships between social, environmental and biological influences on participation in physical activity;
- develop a critical perspective on physical activity;
- use practical activity to enhance the theoretical understanding of physical performance;
- use correct terminology when explaining theoretical and practical concepts.

STRUCTURE

The study is made up of four units. Each unit deals with specific content and is designed to enable students to achieve a set of outcomes. Each outcome is described in terms of key knowledge and skills.

ENTRY

There are no prerequisites for entry to Units 1, 2 and 3. Students must undertake Unit 3 prior to undertaking Unit 4. Units 1 to 4 are designed to a standard equivalent to the final two years of secondary education. All VCE studies are benchmarked against comparable national and international curriculum.

DURATION

Each unit involves at least 50 hours of scheduled classroom instruction.

CHANGES TO THE STUDY DESIGN

During its period of accreditation minor changes to the study will be notified in the *VCAA Bulletin*. The *VCAA Bulletin* is the only source of changes to regulations and accredited studies and it is the responsibility of each VCE teacher to monitor changes or advice about VCE studies published in the *VCAA Bulletin*.

MONITORING FOR QUALITY

As part of ongoing monitoring and quality assurance, the Victorian Curriculum and Assessment Authority will periodically undertake an audit of Physical Education to ensure the study is being taught and assessed as accredited. The details of the audit procedures and requirements are published annually in the *VCE and VCAL Administrative Handbook*. Schools will be notified during the teaching year of schools and studies to be audited and the required material for submission.

SAFETY

This study may involve the handling of potentially hazardous substances and/or the use of potentially hazardous equipment. It is the responsibility of the school to ensure that duty of care is exercised in relation to the health and safety of all students undertaking the study.

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

In designing courses for this study teachers should incorporate information and communications technology where appropriate and applicable to the teaching and learning activities. The Advice for Teachers section provides specific examples of how information and communications technology can be used in this study.

KEY COMPETENCIES AND EMPLOYABILITY SKILLS

This study offers a number of opportunities for students to develop key competencies and employability skills. The Advice for Teachers section provides specific examples of how students can demonstrate key competencies during learning activities and assessment tasks.

LEGISLATIVE COMPLIANCE

When collecting and using information, the provisions of privacy and copyright legislation, such as the Victorian *Information Privacy Act 2000* and *Health Records Act 2001*, and the federal *Privacy Act 1988* and *Copyright Act 1968* must be met.

Assessment and reporting

SATISFACTORY COMPLETION

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's performance on assessment tasks designated for the unit. Designated assessment tasks are provided in the details for each unit. The Victorian Curriculum and Assessment Authority publishes an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment for Units 3 and 4.

Teachers must develop courses that provide opportunities for students to demonstrate achievement of outcomes. Examples of learning activities are provided in the Advice for Teachers section.

Schools will report a result for each unit to the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory).

Completion of a unit will be reported on the Statement of Results issued by the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory). Schools may report additional information on levels of achievement.

AUTHENTICATION

Work related to the outcomes will be accepted only if the teacher can attest that, to the best of their knowledge, all unacknowledged work is the student's own. Teachers need to refer to the current year's *VCE and VCAL Administrative Handbook* for authentication procedures.

LEVELS OF ACHIEVEMENT

Units 1 and 2

Procedures for the assessment of levels of achievement in Units 1 and 2 are a matter for school decision. Assessment of levels of achievement for these units will not be reported to the Victorian Curriculum and Assessment Authority. Schools may choose to report levels of achievement using grades, descriptive statements or other indicators.

Units 3 and 4

The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4.

In Physical Education the student's level of achievement will be determined by school-assessed coursework and an end-of-year examination. The Victorian Curriculum and Assessment Authority will report the student's level of performance on each assessment component as a grade from A+ to E or UG (ungraded). To receive a study score, students must achieve two or more graded assessments and receive S for both Units 3 and 4. The study score is reported on a scale of 0–50. It is a measure of how well the student performed in relation to all others who took the study. Teachers should refer to the current year's *VCE and VCAL Administrative Handbook* for details on graded assessment and calculation of the study score. Percentage contributions to the study score in Physical Education are as follows:

- Unit 3 school-assessed coursework: 25 per cent
- Unit 4 school-assessed coursework: 25 per cent
- End-of-year examination: 50 per cent

Details of the assessment program are described in the sections on Units 3 and 4 in this study design.

Unit 1: Learning and improving skill

This unit looks at a range of factors that influence learning and improving physical skills and the role of the coach in making this happen. The ways in which a coach influences his or her athletes can have a significant effect on their performance, and the methods and approaches that the coach puts into practice will impact on the individual athlete in different ways. By studying various sports psychology concepts such as arousal and anxiety, and the effects these can have on performance, students will be able to apply these psychological principles to the sporting arena.

Students will also focus on general principles that are common to analysing physical performance and learning physical skills, and the biomechanical principles of movement involved in these skills. The unit approaches the biomechanics of physical skills from the perspective of improving physical performance. Students use practical activities to enhance the theoretical understanding of factors involved in learning and improving skill.

AREA OF STUDY 1

Movement analysis

An individual's improvement in performing motor skills will be dependent on his or her ability to acquire, apply and evaluate knowledge and understanding about biomechanical and skill acquisition principles. This information is used to enhance physical performance. Students analyse basic movement patterns demonstrated by the learner and compare these to known movement patterns. They can then understand how the coach or athlete can modify actions to bring about improvement. Understanding the principles underlying skill learning also leads to enhanced performance. The coach must always consider the skill level of his or her athletes and at all times allow for individual differences in skill and maturity levels.

Outcome 1

On completion of this unit the student should be able to explain the application of biomechanical and skill learning principles in analysing how motor skills are learnt and improved.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 1.

Key knowledge

This knowledge includes

- skill learning principles such as stages of skill learning, factors affecting skill learning (for example types of skills, stages of learning, transfer and mental practice); information processing systems and the provision and use of feedback in enhancing performance;
- ways in which skill levels vary from beginner through to the skilled elite athlete;
- developing and refining basic movement patterns (for example striking, throwing, running and stopping) by applying a selection of biomechanical principles such as force and momentum, impact, transfer of momentum, inertia, balance, action and reaction, pushing and pulling.

Key skills

These skills include the ability to

- describe biomechanical and skill learning principles using the correct terminology;
- perform, observe, analyse and report on practical and laboratory exercises related to biomechanics and skill learning;
- compare and contrast the impact of different techniques on performance;
- evaluate the efficiency of movement techniques using biomechanical principles.

AREA OF STUDY 2**Coaching for enhanced performance**

The coach plays a crucial role in developing and enhancing skills and skilled performance in athletes. This area of study focuses on the role of the coach, coaching principles and techniques, including the use of sports psychology, to improve training and performance. In coaching, the different needs and attributes of each individual is taken into consideration.

Outcome 2

On completion of this unit the student should be able to identify and evaluate a range of coaching practices that lead to enhanced sports performance.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 2.

Key knowledge

This knowledge includes

- sports psychology in coaching; for example, motivation, arousal and anxiety, confidence, mental imagery and concentration;
- the roles of a coach in catering for individual needs such as elite and novice, child, adolescent, adult;
- styles of coaching;
- sports coaching skills, including the characteristics and responsibilities of a respected coach.

Key skills

These skills include the ability to

- describe the characteristics and responsibilities of a respected coach;
- perform and evaluate coaching styles in relation to the suitability for the target audience;
- explain how motivation, arousal and anxiety, confidence, mental imagery and concentration in sport and physical activity affect learning and performance.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Teachers should select a variety of assessment tasks for their assessment program to reflect the key knowledge and skills being assessed and to provide for different learning styles.

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass both areas of study.

Demonstration of achievement of Outcomes 1 and 2 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand. Assessment tasks for this unit are:

- a written report;
- a test;
- an oral presentation;
- a laboratory report;
- data analysis;
- a case study analysis;
- a multimedia presentation;
- a report of participation in a practical activity.

Unit 2: The active body

This unit introduces the students to an understanding of physical activity, including the relationships between body systems and physical activity, the place of physical activity in contributing to well being in students' own lives as well as within the wider community, and the classification of physical activity in terms of type and experience. Such knowledge is important to student understanding and is best delivered through a variety of practical activities.

The students will look at a range of factors that influence performance in physical activity. It is recognised that regular participation in physical activity is important for the health of individuals and the community. Students will investigate how the patterns of physical activity vary across the lifespan, including the physical, social and emotional benefits of participation in physical activity. A theoretical model, the Stages of Change, will be used to understand engagement with physical activity.

AREA OF STUDY 1

Body systems and performance

This area of study examines specific body systems. It explores the major components and functions of the body systems and their contributions and interactions during physical activity. Energy for physical activity comes from both aerobic and anaerobic sources and students will be introduced to both of these energy systems.

Outcome 1

On completion of this unit the student should be able to explain how the musculoskeletal, cardio respiratory and energy systems function during physical activity, including how the energy systems work together to enable activity to occur.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 1.

Key knowledge

This knowledge includes

- the musculoskeletal system: movement terminology, major joints and joint action, major muscles, characteristics and functions of skeletal muscle fibre types, nervous control of muscles, the mechanics of breathing, types of muscular contraction;

- the cardio respiratory system: structure of the heart and lungs, mechanics of breathing, gaseous exchange, blood vessels, blood flow around the body at rest and during exercise;
- introduction to aerobic and anaerobic energy systems, including aerobic and anaerobic glycolysis.

Key skills

These skills include the ability to

- use correct terminology to describe the role of the body systems at rest and when undertaking physical activity;
- observe and record how the body systems function during physical activity;
- identify and discuss the range of acute effects that physical activity has on the body;
- perform, observe, analyse, evaluate and report on laboratory exercises related to the body systems.

AREA OF STUDY 2

The impact of physical activity on the individual

This area of study focuses on the range of physical activities available in the community and the classification of these activities in terms of types and experiences. The health consequences of physical inactivity and the health benefits of regular physical activity are explored when considering contemporary attitudes towards physical activity. Students understand the concept of the Stages of Change model as a framework for understanding the factors that influence participation in physical activity.

Outcome 2

On completion of this unit the student should be able to explain the impact of participation in physical activity on the health of selected population(s) and analyse factors affecting participation in physical activity.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 2.

Key knowledge

This knowledge includes

- the concepts of exercise, physical fitness and physical activity;
- dimensions of physical activity including type, frequency, intensity and duration;
- the nature of physical activity across the human lifespan;
- health benefits (physical, social and emotional) of regular physical activity;
- health consequences of physical inactivity including mental health, Type 2 diabetes, obesity, cardiovascular disease, hypertension and high cholesterol levels;
- factors influencing participation in physical activity including individual, social and physical environment;
- understanding the Stages of Change model to explain engagement with physical activity.

Key skills

These skills include the ability to

- compare and contrast the concepts of exercise, physical fitness and physical activity;
- participate in a variety of activities that target particular age groups across the lifespan and evaluate the associated health benefits (physical, social and emotional);
- identify the Stages of Change of involvement in physical activity (Pre Contemplation, Contemplation, Determination, Action, Maintenance and Termination);
- collect and analyse data related to positive health effects of physical activity;
- identify the consequences of physical inactivity as related to mental health, Type 2 diabetes, obesity, cardiovascular disease, hypertension and high cholesterol levels.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Teachers should select a variety of assessment tasks for their assessment program to reflect the key knowledge and skills being assessed and to provide for different learning styles.

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass both areas of study.

Demonstration of achievement of Outcomes 1 and 2 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand. Assessment tasks for this unit are:

- a written report;
- a test;
- an oral presentation;
- a laboratory report;
- data analysis;
- a case study analysis;
- a multimedia presentation;
- a report on participation in a physical activity.

Unit 3: Physiological and participatory perspectives of physical activity

This unit introduces students to an understanding of physical activity from a physiological perspective. In particular, the contribution of energy systems to performance in physical activity is explored, as well as the health benefits to be gained from participation in regular physical activity. The underlying physiological requirements of an activity being used for health or for fitness are the same.

There are many factors that influence an individual to initially begin and then continue on with some form of regular physical activity. In this unit, students study and apply various models to identify strategies that will be effective in promoting participation in some form of regular activity.

AREA OF STUDY 1

Monitoring and promotion of physical activity

This area of study focuses on patterns of participation in physical activity and the National Physical Activity Guidelines. Using subjective methods such as recall, self-report logs or diaries, or objective methods such as heart rate telemetry, pedometry, accelerometry and observational tools, students assess their own or others' activity levels. They analyse the advantages and limitations of these various methods. Using setting-based models to explain physical activity promotion, they collect and analyse data from a range of settings such as schools, community settings and the workforce. They investigate physical activity promotion through individual-based strategies such as telephone assisted or Internet-based counselling, and population-based strategies such as environmental change, for example introducing bicycle paths, as well as media campaigns, and marketing and policy development.

Outcome 1

On completion of this unit the student should be able to analyse individual and population levels of participation in physical activity, and evaluate strategies that promote adherence to the National Physical Activity Guidelines.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 1.

Key knowledge

This knowledge includes

- the elements of the National Physical Activity Guidelines;
- subjective methods of assessing physical activity including recall, self-report logs or diaries, and objective methods of assessing physical activity including heart rate telemetry, pedometry, accelerometry and observational tools;
- settings-based approaches to promoting physical activity in schools, community and the workforce;
- a range of strategies including individual and population-based strategies for targeting physical activity promotion within defined population groups;
- theoretical models used to explain participation in physical activity, including Stages of Change and self-efficacy models.

Key skills

These skills include the ability to

- describe the National Physical Activity Guidelines;
- collect, analyse and interpret data on physical activity patterns compared to the National Physical Activity Guidelines;
- compare subjective and objective methods of assessing physical activity levels;
- collect and analyse information on individual and population-based physical activity promotion strategies from school, community and workplace settings;
- apply theoretical models to critique strategies used to target physical activity promotion within defined population groups.

AREA OF STUDY 2**Physiological requirements of physical activity**

This area of study explores energy systems, fatigue and recovery. It examines the way in which energy for activity is created through oxygen and food supplies. It also considers the physiological effects of muscular fatigue, and speeds of recovery.

Outcome 2

On completion of this unit the student should be able to analyse the role and relative contribution of the energy systems during physical activity.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 2.

Key knowledge

This knowledge includes

- characteristics and interplay of energy systems for physical activity and recovery in relation to duration, intensity and type of activity;
- fuels required for physical activity and the conversion of food to energy;
- muscular fatigue mechanisms, specifically fuel depletion, metabolic by-products, and dehydration.

Key skills

These skills include the ability to

- describe the interplay of the energy systems, using correct terminology;
- analyse the relationship between energy systems and physical activity;
- perform, observe, analyse and report on laboratory exercises designed to explore the relationship between energy systems during physical activities;
- identify and explain the relationship between physical activity, muscle fatigue and recovery.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit. The Victorian Curriculum and Assessment Authority publishes an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 3 will contribute 25 per cent to the study score.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment handbook published by the Victorian Curriculum and Assessment Authority. The assessment handbook also includes advice on the assessment tasks and performance descriptors for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that they are comparable in scope and demand. Teachers should select a variety of assessment tasks for their program to reflect the key knowledge and skills being assessed and to provide for different learning styles.

Outcomes	Marks allocated*	Assessment tasks
Outcome 1 Analyse individual and population levels of participation in physical activity, and evaluate strategies that promote adherence to the National Physical Activity Guidelines.	25	A response in a written format focusing on analysis of individual and community patterns of participation.
	25	AND A response in one or more of the following forms, which focuses on strategies to promote participation in physical activity: <ul style="list-style-type: none"> • a written report • a case study analysis • a test (short answer and/or extended response) • a visual or multimedia presentation • a media analysis.
Outcome 2 Analyse the role and relative contribution of the energy systems during physical activity.	25	Laboratory report analysing the relative energy contribution of energy systems when undertaking aerobic and anaerobic physical activity.
	25	AND A response in one or more of the following forms, which focuses on energy systems, muscular fatigue and recovery: <ul style="list-style-type: none"> • a written report • a test (short answer and/or extended response) • a case study analysis • data analysis exercise.
Total marks	100	

*School-assessed coursework for Unit 3 contributes 25 per cent to the study score.

Unit 4: Enhancing physical performance

Improvements in physical performance, in particular fitness, depend on the ability of the individual or coach to acquire, apply and evaluate knowledge and understanding about training. Exercise physiology is concerned with individual responses and adaptations through exercise. Students experience a variety of practical activities involving a range of training methods and fitness activities. Students learn to accurately assess the particular energy and fitness needs of the sport or activity for which the athlete is training, through analysis of data collected from a game or activity.

AREA OF STUDY 1

Enhancing fitness through training

This area of study focuses on the components of fitness and assessment of fitness from a physiological perspective. Students consider the manner in which fitness can be improved by the application of appropriate training principles and methods and participation in activity data collection, fitness testing and fitness training. Students collect data and apply theoretical information in a practical and meaningful way.

Outcome 1

On completion of this unit the student should be able to plan and evaluate training programs to enhance physical fitness.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 1.

Key knowledge

This knowledge includes

- fitness components and definitions;
- data collection activity analysis including skill analysis, work–rest ratios, movement patterns, muscle groups and muscle action;
- assessment of fitness including methodology, techniques and outcomes;
- fitness training principles, including specificity, intensity, duration, frequency and overload;
- fitness training methods to improve strength, speed, endurance, flexibility, power and motor skill ability.

Key skills

These skills include the ability to

- explain training principles and methods;
- perform, observe, analyse and report on laboratory exercises designed to explore the assessment of fitness and the relationship between at least two training methods and gains to fitness;
- create a training program that reflects appropriate application of training methods and principles to bring about chronic adaptation;
- evaluate a training program.

AREA OF STUDY 2

Strategies for enhancing sports performance

This area of study focuses on a range of factors and strategies that influence improvement and limit performance in physical activities. How each individual adapts both physically (training responses) and mentally (psychological aspects such as motivation, anxiety and confidence), to a training program will vary. It is vital that the training program is correctly implemented, including appropriate recovery regimes. Dietary procedures can also improve performance, and students identify a range of dietary strategies that combine with appropriate recovery and risk management systems to enhance performance and recovery. While the focus of improvement and performance enhancing practices will be on legal strategies, it is important to take into consideration the ethical considerations of both legal and illegal practices.

Outcome 2

On completion of this unit the student should be able to evaluate practices and/or strategies that are used in conjunction with each other to enhance sports performance.

To achieve this outcome the student will draw on knowledge and related skills outlined in area of study 2.

Key knowledge

This knowledge includes

- chronic adaptations of the cardiovascular, respiratory and muscular systems to training;
- managing a training load, including physiological and psychological factors affecting recovery and overtraining;
- sports injury risk management systems;
- nutrition for improving performance, including dietary enhancement procedures;
- ethical considerations in the use of practices (both legal and illegal) employed to enhance performance and assist training and recovery.

Key skills

These skills include the ability to

- summarise accurately information in relation to chronic adaptations to training;
- identify and explain from physiological and psychological perspectives factors affecting recovery and overtraining;
- describe risk management systems appropriate to training and recovery;
- analyse and evaluate dietary procedures used to enhance training and performance;
- analyse ethical considerations relating to the use of performance enhancing practices.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit. The Victorian Curriculum and Assessment Authority publishes an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement for Unit 4 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 4 will contribute 25 per cent to the study score.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment handbook published by the Victorian Curriculum and Assessment Authority. The assessment handbook also includes advice on the assessment tasks and performance descriptors for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that they are comparable in scope and demand. Teachers should select a variety of assessment tasks for their program to reflect the key knowledge and skills being assessed and to provide for different learning styles.

Outcomes	Marks allocated*	Assessment tasks
Outcome 1 Plan and evaluate training programs to enhance physical fitness	25	Laboratory report on activity analysis and justification of fitness tests as part of planning for a training program. AND A response in one or more of the following formats, which focuses on the application and evaluation of training methods and the principles of training to a specific physical activity or sport: <ul style="list-style-type: none"> • a written report • a case study analysis • a test (short answer and/or extended response) • structured questions.
	25	
Outcome 2 Evaluate practices and/or strategies that are used in conjunction with each other to enhance performance.	25	A written report that focuses on the chronic adaptations to training. AND A response in one or more of the following formats, which identifies and analyses various strategies used to enhance sporting performance: <ul style="list-style-type: none"> • a written report • a test (short answer and/or extended response) • a case study • a laboratory report • structured questions.
	25	
Total marks	100	

*School-assessed coursework for Unit 4 contributes 25 per cent to the study score.

End-of-year examination

Description

All outcomes in Units 3 and 4 will be examined. All of the key knowledge and skills that underpin the outcomes in Units 3 and 4 are examinable. All outcomes from Units 3 and 4 will contribute approximately equally to the examination.

Format

All questions are compulsory.

The examination will be set by a panel appointed by the Victorian Curriculum and Assessment Authority.

Conditions

The examination will be completed under the following conditions:

- Duration: two hours.
- Date: end-of-year, on a date to be published annually by the Victorian Curriculum and Assessment Authority.

- Victorian Curriculum and Assessment Authority examination rules will apply. Details of these rules are published annually in the *VCE and VCAL Administrative Handbook*.
- The examination will be marked by a panel appointed by the Victorian Curriculum and Assessment Authority.

Contribution to final assessment

The examination will contribute 50 per cent to the study score.

Advice for teachers

DEVELOPING A COURSE

A course outlines the nature and sequence of teaching and learning necessary for students to demonstrate achievement of the set of outcomes for a unit. The areas of study broadly describe the learning context and the knowledge required for the demonstration of each outcome. Outcomes are introduced by summary statements and are followed by the key knowledge and skills which relate to the outcomes.

Teachers must develop courses that include appropriate learning activities to enable students to develop the knowledge and skills identified in the outcome statements in each unit.

For Units 1 and 2, teachers must select assessment tasks from the list provided. Tasks should provide a variety and the mix of tasks should reflect the fact that different types of tasks suit different knowledge and skills and different learning styles. Tasks do not have to be lengthy to make a decision about student demonstration of achievement of an outcome.

In Units 3 and 4, assessment is more structured. For some outcomes, or aspects of an outcome, the assessment tasks are prescribed. The contribution that each outcome makes to the total score for school-assessed coursework is also stipulated.

Practical activities should be used throughout the course to complement theoretical components.

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

In designing courses and developing learning activities for Physical Education, teachers should make use of applications of information and communications technology and new learning technologies, such as computer-based learning, multimedia and the World Wide Web, where appropriate and applicable to teaching and learning activities.

It is appropriate for students to summarise information using Excel as a method to organise their data in tables. Students could also use multimedia tools such as PowerPoint, video capture and Microsoft Word to present their work. Video cameras and digital cameras can be used for movement analysis. Communication forums and the use of email could be used to share experiences with other schools or to generate discussion within and outside the classroom.


KEY COMPETENCIES AND EMPLOYABILITY SKILLS

Students undertaking the following types of assessment, in addition to demonstrating their understanding and mastery of the content of the study, typically demonstrate the following key competencies and employability skills.

Assessment task	Key competencies and employability skills
Laboratory report	Problem-solving, planning and organisation, (written) communication, initiative and enterprise
Written report	Planning and organisation, (written) communication, self-management
Test (short answer and/or extended response)	Planning and organisation, (written) communication, self-management
Structured questions	Planning and organisation, (written) communication, self-management
Case study analysis	Problem-solving, planning and organisation, (written) communication, self-management
Data analysis exercise	Problem-solving, planning and organisation, (written) communication, self-management
Media analysis	Planning and organisation, (written) communication, self-management
Visual or multimedia presentation	Use of information and communications technology, self management, planning and organisation, initiative and enterprise
Oral presentation	Planning and organisation, (oral) communication, self-management

In completing work for this study, students may also demonstrate other key competencies and employability skills, such as working with others and in teams, and using mathematical ideas and techniques.

LEARNING ACTIVITIES

Examples of learning activities for each unit are provided in the following sections. Examples highlighted by a shaded box are explained in detail in accompanying boxes. The examples that make use of information and communications technology are identified by this icon .

Unit 1: Learning and improving skill

AREA OF STUDY 1: Movement analysis

Outcome 1

Explain the application of biomechanical and skill learning principles in analysing how motor skills are learnt and improved.

Examples of learning activities

outline skill acquisition principles including stages of skill learning, types of skills, information processing models and feedback; relate these to practical sporting examples and coaching

as a class, categorise a range of activities by selecting a position along a continuum with a sign labelled 'open' at one end of the classroom and 'closed' at the other; give reasons for your choices

perform a skills circuit and categorise each skill according to muscular effort (fine or gross), type of movement (discrete, continuous or serial) and environment (open or closed)

perform a laboratory activity to investigate the types of practice; in groups, perform distributed, massed and mental practice in a skill such as a tennis forehand to a target and compare suitability for learners

perform a laboratory activity to investigate the types of feedback; in pairs, blindfolded, throw a bean-bag into a hoop; provide varying amounts of feedback and discuss the impact of feedback on results

undertake a laboratory activity investigating summation of force by progressively using more body parts; throw a ball sitting, standing facing forward, standing side on and using a run up; present a written report

undertake a laboratory activity investigating top spin and back spin in tennis, cricket or snooker; complete a written report of the activity

undertake a laboratory activity investigating flattening the arc by performing a hockey drive or a softball pitch; initially use a straight arm and no step forward, then step forward onto a straight leg, then step forward onto a bent leg, then bend the elbow before ball release, then finish with a follow through; compare results and discuss the technique used to enhance accuracy

using stimulus material such as photographs and videos, identify in specific sporting situations biomechanical principles such as action and reaction, stability, force summation, momentum, impact, flattening the arc

undertake a laboratory activity investigating velocity and acceleration in various sprinting distances; place cones at various points in the sprints and calculate velocity and acceleration using stopwatches





video tape a skill such as a basketball set shot and calculate velocity and acceleration at selected points using the Logger Pro technology (see Resources)

participate in various athletics events such as the long jump, triple jump, high jump, discus, shot put and javelin and investigate factors affecting projectile motion



use a videotape or a computer program such as Swinger (see Resources) to review a basic movement pattern such as a golf swing and identify characteristics of skilled performers

 research and present a PowerPoint presentation on a technique change or adaptation in a sport that has resulted in performance improvement based on biomechanical efficiency

 using Skill Acquisition (Bolton and Duncan, see Resources under CD-ROMs and software), participate in a variety of software activities to measure reaction time, memory, perceptions

learn a new skill (examples include juggling, throwing with the non dominant hand); present a report outlining the differences in skill level between the beginner through to the skilled elite athlete

Detailed example

LABORATORY REPORT: STAGES OF LEARNING

Aim: To experience the stages of learning.

Method:

1. Students attempt to juggle 3 balls using two hands without any demonstration, practice or feedback. Attempt this skill 10 times, and have a partner record how many times you can throw a ball in the air. If you are able to perform this skill, attempt to learn how to juggle 4 balls, or a skill that you are not able to do.
2. Have a juggling expert demonstrate the skill to the class. Students practice the skill. Ensure that all students receive adequate feedback.
3. Students must practice the skill every day for a month. Students need to practice at home and in class time. Students need to purchase their own juggling balls. Students need to practice in small blocks of time.
4. After a month, juggle 3 balls using two hands and have a partner record how many times you can throw a ball in the air.

Results: Draw up a table listing number of attempts, pre-test and post-test results.

Discussion:

1. By referring to your results, discuss if learning occurred and give reasons for this.
2. Discuss how you moved through the stages of learning by referring to the characteristics of each stage.
3. Describe the coaching or teaching strategies used that were specific to your stage of learning (ensure you discuss appropriate types of feedback used).
4. Discuss the type of practice used and their appropriateness for the learner.

Conclusion:

Summarise major findings and refer to your results to draw a conclusion.

AREA OF STUDY 2: Coaching for enhanced performance

Outcome 2

Identify and evaluate a range of coaching practices that lead to enhanced sports performance.

Examples of learning activities

brainstorm a class list of the skills and characteristics of a respected coach, based on the experiences and expectations of the class

perform a case study analysis of a coach; evaluate the suitability of the coach for the learner(s) and discuss the coaching styles, skills and characteristics that he or she possesses; address the roles of any coaching personnel employed by the athlete or club

invite a coach to speak to the class about the strategies he or she uses to cater for various skill levels



select a sport and using online research construct a list of its basic skills for the three recognised stages of skill acquisition; design some coaching drills to improve these skills at each of the three stages of learning

coach a class or community group, ensuring individual needs are catered for; discuss as a class how the coaching session would be modified to cater for changing individual needs by referring to skill acquisition principles and biomechanical changes

analyse various psychological controls on performance, such as motivation techniques, arousal and anxiety, confidence, mental imagery and concentration methods

undertake laboratory activities to experience the benefits or shortcomings of various arousal techniques that are available to coaches

watch a motivational video used by sporting teams and discuss its effectiveness

arrange a competition with both intrinsic and extrinsic motivations and discuss as a class the preferred motivations; relate this to coaching strategies

identify and discuss the characteristics of different coaching styles (authoritarian, co-operative, casual); role-play these styles

Detailed example

CASE STUDY ANALYSIS: SPORTS COACHING

Observe a coach at work. Present your findings in a written report, ensuring that you address the following:

- The coaching style and the appropriateness for the learner(s).
- The skills and characteristics that the coach possesses and the appropriateness for the learner(s).
- The activities and type of practice used in the session and the appropriateness for the learner(s).
- The type of feedback used and the appropriateness for the learner(s).
- The ability and necessity of the coach to cater for different skill levels.
- The roles of any coaching personnel employed by the athlete or club.
- The overall effectiveness of the coach and how the coach can improve, ensuring you are specific to the needs of the learner(s).

Unit 2: The active body

AREA OF STUDY 1: Body systems and performance

Outcome 1

Explain how the musculoskeletal, cardio respiratory and energy systems function during physical activity, including how the energy systems work together to enable activity to occur.

Examples of learning activities

perform a quiz or play bingo to label and identify major bones and muscles within the body



use Internet sites such as www.bbc.co.uk/science/humanbody or computer software packages such as Body Systems (see Resources) to label and identify major bones and muscles within the body

demonstrate the joint actions, describing their structure and function; provide a range of sporting examples and identify the joint action and classification of the major joint used



use a digital or video camera to record students participating in selected sports/laboratory; use this visual record to identify the major movements created by bones and muscles during performance of the activity



use Internet sites such as www.howstuffworks.com to observe and examine how a message travels to the muscle via the nervous system

explore the basic structure and function of the circulatory and respiratory systems

colour the pathway of oxygenated and deoxygenated blood in both systemic and pulmonary circulation

in pairs, make cards that label the various structures in the respiratory and circulatory systems that an oxygen molecule moves through on its journey to the muscles



use basic technology such as spirometers to access some of the various lung volumes of class members; graph and analyse data



use Internet sites such as www.howstuffworks.com or computer software such as eteaching (see Resources) or text studies which clarify gaseous exchanges through the respiratory and circulatory systems; compare the levels of oxygen at different sites in the body under rest and activity conditions

undertake laboratory activities to record and report on the acute effects of physical activity on various parameters such as heart rate, stroke volume, cardiac output, blood pressure, arteriovenous difference, blood circulation, body temperature, perspiration levels, respiration rate, lung volumes (tidal volume and ventilation), neurological functions, energy sources, waste product levels

perform laboratory activities that investigate anaerobic and aerobic activities; report on basic differences between the anaerobic and aerobic energy systems by referring to intensity and duration

Detailed example**LABORATORY ACTIVITY: MUSCLE MOVEMENTS IN A CIRCUIT**

Aim: Use a digital or video camera to analyse the joint actions, agonist muscle and type of contractions used in a weights circuit.

Method:

1. Place a card outlining the exercise at each station.
2. Demonstrate correct technique for each station.
3. Perform an adequate warm up.
4. Place each student at a station. Use music for motivation and timing at each station.
5. Fill in the results table after each station.

Results:

Draw up a table with each exercise. Using your visual record for each exercise, list the major joint used, the major joint action, the agonist muscle in the 'lifting' phase, the type of contraction in the 'lifting' phase, the agonist muscle in the 'letting go' phase and the type of contraction in the 'letting go' phase.

Discussion:

1. Describe the importance of the warm up before you began your circuit.
2. Discuss how movement at a joint is initiated by the nervous system.
3. Describe the process of muscular contraction by referring to the sliding filament theory.
4. Once movement is initiated by the nervous system, describe how movement is created at a joint.
5. What type of contraction is predominantly used in the 'lifting' phase of the exercise compared to the 'letting go' phase? Give reasons for this.

Conclusion:

Summarise your discussion, outlining how movement is created and the types of contractions used under different conditions by referring to your results.

AREA OF STUDY 2: The impact of physical activity on the individual**Outcome 2**

Explain the impact of participation in physical activity on the health of selected population(s) and analyse factors affecting participation in physical activity.

Examples of learning activities

discuss perceptions of physical activity, exercise and fitness; provide definitions for each

construct a large poster listing the various domains of physical activity including occupational physical activity, household physical activity, transportation (e.g. walking or bike riding to and from work or school), leisure time physical activity (includes exercise and sport); under each of these headings list examples of activities in which students participate on a regular basis

undertake practical activities to experience a range of sports, fitness and recreation activities; e.g. team games or individual sports; fitness: weight training, interval training, circuit training, fartlek training, continuous training, aerobics, boxercise, super circuits, spinning classes, pump classes; recreation: bushwalking, ten pin bowling, windsurfing, skiing, surfing, golf, fishing, gardening; discuss the classifications and the types of experiences each activity provides; also discuss the age groups and community groups to which each activity would appeal

establish clear definitions of 'sport', 'fitness' and 'recreation' and compile lists of activities that could be categorised as sport, fitness and recreation

discuss the health benefits associated with lifestyle physical activities such as walking, swimming, tennis, rollerblading, surfing or paddling and why, in addition to sport and fitness programs, lifestyle activities should be included as a part of school and community programs; watch a video on extreme sports (see Resources) and discuss the types of experiences the activities provide



use data from websites to construct a timeline that represents physical activity levels in different periods across the lifespan (e.g. childhood, adolescence, adulthood etc); develop a written report summarising your findings

draw up a table summarising the factors associated with physical activity levels among children, adolescents, adults and older adults; discuss any major differences

brainstorm a list of factors affecting participation in physical activity and categorise particular community groups (such as males, females, particular age groups, cultural groups, groups with a disability, different geographically located groups, different socioeconomic groups) to which each factor is applicable

complete the Risko chart and explore the risk factors of Coronary Heart Disease; measure your blood pressure and calculate your BMI; suggest strategies to reduce these risks factors



visit appropriate websites (see Resources) to investigate the issue of childhood obesity; write an article for the local newspaper, parent newsletter or create a poster outlining the impact of obesity on health and develop a list of suggestions that families could use to overcome the problem

draw a diagram of the Stages of Change; identify what stage you would be at in relation to being physically active; interview several family members or friends to determine their stage; discuss factors influencing people to engage in physical activity

Detailed example

WRITTEN REPORT: PHYSICAL ACTIVITY LEVELS ACROSS THE LIFESPAN

Use websites such as the Australian Bureau of Statistics and the Australian Sports Commission (see Resources) to construct a timeline that identifies patterns of participation for different age groups across the lifespan.

Use the timeline to discuss how physical activity patterns vary across the lifespan. Summarise the factors associated with physical activity levels

amongst children, adolescents, adults and older adults. Discuss differences and changes in physical activity levels.

Identify key health benefits of physical activity for different stages across the lifespan. Suggest strategies to increase participation for the age group.

Unit 3: Physiological and participatory perspectives of physical activity

AREA OF STUDY 1: Monitoring and promotion of physical activity

Outcome 1

Analyse individual and population levels of participation in physical activity, and evaluate strategies that promote adherence to the National Physical Activity Guidelines.

Examples of learning activities



use data from the Australian Bureau of Statistics, text studies and/or journal articles to identify the most popular activities for each age group across the lifespan; using an Excel spreadsheet, graph the most popular physical activities for adults and children; discuss any age related or gender differences in activity preference



survey families to establish patterns of participation in different age groups (e.g. common sports or activities, regularity, frequency, reasons for activity, levels of involvement); graph results using Excel; analyse the data, give reasons for the patterns of participation and suggest strategies to improve the results; prepare a report for the community group, local newspaper, parent newsletter, school website, community website or a poster outlining recommendations for improvements to activity levels; use information obtained and analysed to justify strategies suggested by the class



using a recognised physical activity survey such as the Active Australia survey or the International Physical Activity Questionnaire (IPAQ) long or short version (see Resources under websites), conduct a survey of male and female students in your school to determine the types of physical activity undertaken and the number of hours spent on physical activity each week; graph class data using Excel; analyse results, outlining the percentage of the sample that are meeting the physical activity guidelines; discuss the short- and long-term impact upon the health of these populations



use email or Alta Forum to contact other schools around Australia or the world and compare the types of physical activities undertaken, patterns of participation and factors affecting participation in physical activity

interview several adults about their physical activity habits and determine their Stages of Change; select one individual who is not currently in the maintenance stage and design an information page or brochure that is tailored to his or her particular stage (e.g. pre-contemplators need more information to raise awareness of the benefits of being active, whereas more active people require behavioural information such as strategies to enlist social support)

construct a school-based survey that assesses the influences on participation within the school and/or local community, e.g. Physical Education teachers, sports coaches, facilities, sporting programs, school history; analyse reasons for initial and continued participation amongst secondary school students

complete a case study of an elite sportsperson, analysing the influences affecting his or her initial and continued participation in sport

compile a list of intrinsic and extrinsic rewards that have motivated class members to begin or continue participation in an activity

develop a case study analysis of your own level of physical activity; monitor and analyse your activity levels

assess the physical activity levels of an individual by using an objective method such as HR telemetry, pedometry, accelerometry, and/or a subjective method such as recall, observational logs or diaries; discuss the advantages and limitations of the method(s) used

brainstorm ideas for promotion of physical activity among children or older adults; design a 30-second commercial or a slogan for a media campaign to promote physical activity among the target population; discuss the potential advantages and disadvantages of mass media and a strategy for encouraging people to be more active



use websites or contact organisations such as Australian Sports Commission, VicHealth, Football Victoria, Royal Lifesaving Society, Go Ride a Wave and local gyms and/or leisure centres to gather information about current programs for different populations; draw up a table with the target group, list government and private programs available for the target group, outline the aim of the program and how the program is promoted



use the telephone directory, local services guide or the Internet to identify services available in the community to provide physical activity for a particular population; arrange to make a visit and formulate questions to help guide your research and then critically evaluate the service in terms of its accessibility and usefulness for the selected population; use a graphics editor or multimedia software to create a brochure, poster or online article



examine various Federal, State or local government initiatives which have been aimed at increasing participation in physical activity amongst different groups within society, e.g. the elderly, executives, factory workers, primary and secondary students, Aboriginal and Torres Strait Islander groups, tertiary students and professional workers

contact various sports governing bodies to establish a range of methods used to increase initial and continued participation for each sport

devise a whole school strategy to promote physical activity for all students and staff that would incorporate aspects of the social and physical environment of the school as well as policies that would need to be implemented; either use your own school or design a strategy for a primary school

perform a case study of physical activity programs implemented in a workplace; analyse the appropriateness of the program, considering employees are at different stages of change; design your own program based on the Stages of Change model; describe several strategies that employers could implement to encourage their staff to be more active and explain how these are tailored, based on employees' Stages of Change

participate in activities suitable for the older aged population such as lawn bowls or water aerobics

analyse the Paralympics' role in promoting the need to provide avenues for people with disabilities to participate in physical activity

within the local community examine the facilities provided for people with disabilities to participate in physical activity; this could include such sporting and recreational areas that cater for activities such as swimming, basketball, archery, skiing, sailing, canoeing or kayaking, tennis, and athletics

use a valid observational instrument, e.g. SOFIT (see Resources) to assess the amount of time students engage in moderate to vigorous physical activity during a physical education lesson

use a valid observational instrument, e.g. SOPLAY or BEACHES (see Resources) or design your own to determine the activity level of a student during recess or lunch breaks; determine the proportion of time spent engaged in physical activity; discuss what kinds of physical activities different groups engage in and assess if these activities vary by age, gender and other influencing factors

Detailed example**CASE STUDY ANALYSIS: MY PERSONAL LEVELS OF PHYSICAL ACTIVITY**

Wear a pedometer for a week. Use a log to record daily step counts and calculate the average daily step count. Compare weekdays to days on weekends.

Graph daily steps.

Determine if you meet the daily recommendation of 10,000 steps.

Determine the percentage proportion of the class that met the daily recommendation of 10,000 steps.

If you do meet the recommendations, discuss how you do this and how you could make further practical increases in levels of physical activity.

Also discuss how you can maintain these levels into the next stage of the lifespan.

If you do not meet the recommendations, devise strategies for increasing daily steps to incorporate more physical activity into your daily routine (e.g. get off the tram one stop earlier, walk around during lunchtime etc.). Discuss how you would maintain improved levels into the next stage of the lifespan.

Assess your self-efficacy (see Resources under websites) to be active under certain circumstances and identify barriers to being active. Discuss how you could overcome these barriers.

AREA OF STUDY 2: Physiological requirements of physical activity**Outcome 2**

Analyse the role and relative contribution of the energy systems during physical activity.

Examples of learning activities

outline the basic chemical pathways leading to Adenosine Triphosphate (ATP) production in each of the three energy systems

summarise the chemical pathways of the anaerobic and aerobic energy systems in ATP production within the sarcomere

draw up a table listing the characteristics of the three energy systems; include intensity, duration, fuel sources, amount of ATP produced, speed of ATP produced, by-products, advantages of the energy system and limitations of the energy system



using heart rate monitors and software such as Heart Rate Analysis (see Resources under CD-ROMs and Software), undertake laboratory activities to promote student appreciation of the relationship between energy systems and different types of physical activity of varying intensities and durations; record and analyse the data

draw up a table or mind map summarising the characteristics of each food fuels; include food sources, the recommended percentage of total daily intake, how they travel in the blood, how they are stored in the body, where they are stored In the body, conditions under which they are used to make energy

participate in practical activities to promote student awareness of the concept of the interplay between the three energy systems during a team sport; identify the percentage contribution of the energy systems in these activities

develop a glossary of terms including oxygen deficit, steady state, oxygen debt and maximal oxygen uptake; also include parameters associated with the circulatory and respiratory systems such as cardiac output and ventilation

watch the video 'All Systems Go' (see Resources); complete the accompanying structured questions



visit available tertiary education centres to use high technology fitness testing equipment to analyse oxygen delivery



in small groups, interview an elite athlete and complete a case study analysis on causes of fatigue and methods of recovery specific to their sport; investigate strategies used to manage a training load; present the findings to the rest of the class as an oral or multimedia presentation

undertake laboratory activities to highlight the effects of fatigue on performers in various types of activities such as athletics running, throwing and jumping events, team or individual sports or recreational pursuits such as rock climbing; identify appropriate methods of recovery

Detailed example

LABORATORY REPORT: COMPARISON OF ANAEROBIC AND AEROBIC ACTIVITY

Aim: To compare the energy systems used in maximal and sub maximal efforts.

Method: Perform a continuous activity such as cycling, swimming, rowing or running. Attach heart rate monitors correctly.

1. Perform an adequate warm up.
2. In an exercise session, perform 4 maximal efforts of the activity for a total of 20 seconds. Perform an active recovery for 5 minutes in between each bout. Record your heart rate immediately after the 20 second work bout.
3. In a separate exercise session, perform the activity continuously at a sub maximal intensity for 10 minutes. Record the heart rate every 2 minutes.

Results: Record the heart rate results for each work bout in a table.

Record the heart rate results for the 10 minute continuous activity in a table.

Discussion:

1. Discuss the predominant energy system used in number 2. Give reasons for your answer by referring to the characteristics (intensity, duration, by-products) of the energy system that are specific to the activity.

2. Discuss the predominant energy system used in number 3. Give reasons for your answer by referring to the characteristics (intensity, duration, by-products) of the energy system that are specific to the activity.
3. Outline the chemical pathway that is used to produce ATP in the activity of maximal intensity.
4. Outline the chemical pathway that is used to produce ATP in the activity of sub maximal intensity.
5. Is there any evidence of the production of lactic acid in either activity? Explain your answer by referring to the data.
6. Describe how oxygen gets to the muscles to produce ATP.
7. Discuss the importance of oxygen for enhanced performance by referring to lactic acid tolerance in the maximal efforts and lactate threshold in the sub maximal activity.
8. Discuss the predominant food fuels used in both activities.

Unit 4: Enhancing physical performance

AREA OF STUDY 1: Enhancing fitness through training

Outcome 1

Plan and evaluate training programs to enhance physical fitness.

Examples of learning activities

draw up a table or mind map summarising characteristics of the various fitness components; include the definition, the factors affecting the fitness component, the energy system(s) used to fuel the fitness component and sporting examples



undertake practical and Internet research to establish a rank order of fitness components in a range of nominated sports

perform a range of fitness tests, testing the various fitness components and muscle groups; draw up a table for each test and list fitness component tested, energy system predominantly used, major muscle group used and sports specific to the test

perform a case study analysis on an individual performing a maximal test on the treadmill; analyse the levels of oxygen uptake, ventilation, carbon dioxide and VO₂ maximum; discuss the respiratory ratio, respiratory rates and heart rates at various stages of the test

perform the beep test as a class using heart rate monitors; use results to estimate VO₂ maximum levels; compare differences between genders and fitness levels; discuss expected differences between age groups



perform a data collection activity analysis using a video camera to collect data; analyse activities such as work–rest ratios, movement patterns, skill analysis and muscle groups and muscle actions; analyse the most important fitness components and energy systems for the sport/activity/position

develop a fitness test battery for a selected sport or activity and justify your choice of tests



research online and construct and complete a personal fitness profile that reflects individual fitness compared to peers, similar sport participants, and elite performers

identify various training methods to improve strength, speed, endurance, flexibility and power; perform the various training methods in laboratory activities and outline the appropriate training principles employed to improve these training methods

design and implement a training program that reflects appropriate application of training methods and principles to enhance the fitness of a participant in a particular sport or physical activity



perform fitness testing pre and post the training program; using an appropriate software program, graph the percentage change

attend a training session for elite athletes to identify the major training principles and methods employed by coaches and performers

discuss personal training experiences of class members

in small groups, collect and analyse various representations of fitness within the sporting media and determine which training methods and principles would be paramount in creating each type of fitness

undertake practical activities that demonstrate the importance of warm-up, warm-down and the range of flexibility enhancement procedures

Detailed example**DATA ANALYSIS: SPECIFIC FITNESS IN A TEAM SPORT**

Use a video to analyse an elite athlete from a team sport. Students are placed in groups and gather various pieces of data for at least 10 minutes.

Group 1: monitors the work and rest times.

Group 2: records movement patterns.

Group 3: records the skills performed.

Group 4: records the major muscle group(s) used.

Each group presents their findings and makes them available for the class.

Using the data, discuss the following:

- The most important fitness components required by the player.
- The level of contribution of each energy system during the game for the player.
- Devise a fitness test battery that would be suitable for the player. Justify your choice of tests.

These results may be used at a later date to devise a training program.

AREA OF STUDY 2: Strategies for enhancing sports performance**Outcome 2**

Evaluate practices and/or strategies that are used in conjunction with each other to enhance performance.

Examples of learning activities

using the Internet or texts investigate the adaptations of the cardio respiratory and musculoskeletal systems after both aerobic and anaerobic training programs

using pre and post fitness testing results, analyse adaptations of the cardio respiratory and musculoskeletal systems after a training program; discuss benefits of the adaptations; highlight where no changes have occurred and provide reasons for this



access heart rates of an elite athlete during his or her event using the Internet, texts, journals or past exam papers; perform a case study analysis of the athlete, analysing the predominant energy systems and fitness components used by the athlete; discuss training methods and principles likely to be employed by the athlete and adaptations that would come about from these training methods

provide an elite athlete's training program for the class; identify the training methods and principles utilised and adaptations that would result from the training program


brainstorm physiological and psychological ways to manage a training load to enhance recovery and avoid overtraining

in small groups, investigate appropriate factors used to enhance recovery in a specific sport/activity; each group presents their findings for their allocated sport to the class

discuss ethical issues raised with the use of legal ergogenic aids such as painkillers and illegal ergogenic aids such as the use of growth hormones

discuss the benefits of sports nutrition

outline the differences between high and low glycemic index foods

 research using Internet sites such as Australian Sports Drug Agency (www.asda.org.au/), text studies and journals different nutritional strategies used to enhance performance in a particular sport

analyse the dietary needs of participants to enhance training and performance in a variety of sports, e.g. triathlon, body building, soccer or netball

develop a diet for an ultra-endurance event including the pre-event meal and post-event meal; justify your choices of foods and fluids

Detailed example

CASE STUDY: ETHICS OF PERFORMANCE ENHANCING PRACTICES

- Provide students with a case study of a legal sports enhancing practice which has ethical considerations, e.g. the use of pain killing injections to allow athletes to continue training and/or competing.
- Provide students with another case study, this time of an illegal sports enhancing practice, e.g. the use of growth hormones to boost athletes' body strength.
- Students are to analyse both practices, comparing the positive and/or negative consequences for the athlete.
- Students identify and examine the ethical considerations associated with both practices.
- Students can debate their position as to whether they agree or disagree with the use of the identified practices or present a written response. Responses should include consideration of the ethical issues around use of both practices.

SCHOOL-ASSESSED COURSEWORK

In Units 3 and 4 teachers must select appropriate tasks from the assessment table provided for each unit. Advice on the assessment tasks and performance descriptors to assist teachers in designing and marking assessment tasks will be published by the Victorian Curriculum and Assessment Authority in an assessment handbook. The following is an example of a teacher's assessment program using a selection of the tasks from the Units 3 and 4 assessment tables.

Outcomes	Marks allocated	Assessment tasks
Unit 3		
Outcome 1 Analyse individual and population levels of participation in physical activity, and evaluate strategies that promote adherence to the National Physical Activity Guidelines.	25	A written report that assesses an individual's physical activity levels using subjective or objective methods in a particular setting. Compare these levels to the National Physical Activity Guidelines and discuss how the individual is likely to move through the Stages of Change.
	25	AND A visual presentation that investigates a particular pattern of participation for a specific population and strategies that could improve this pattern of participation in different settings. Use the Stages of Change and self-efficacy models to evaluate particular promotional strategies with the population group.
Outcome 2 Analyse the role and relative contribution of the energy systems during physical activity.	25	A laboratory report that analyses the relative contribution of the energy systems used predominantly in aerobic and anaerobic activities, for example, in running different distances and at different intensities.
	25	AND A data analysis where heart rates, work:rest ratios and movement patterns are measured and collated when an athlete or class member is observed in a team sport. The results analyse the relative contribution of the energy systems identified.
Total marks for Unit 3	100	

Outcomes	Marks allocated	Assessment tasks
Unit 4		
Outcome 1 Plan and evaluate training programs to enhance physical fitness.	25	A laboratory report on a games analysis such as tennis and justification of fitness tests as part of planning for a training program to improve fitness.
	25	AND A short test focusing on the application and evaluation of training methods and the principles of training appropriate to improving performance in tennis.
Outcome 2 Evaluate practices that are used in conjunction with each other to enhance performance.	25	A written report that focuses on the chronic adaptations associated with training for specific fitness improvements in tennis.
	25	AND A case study of a sporting club or athlete that identifies and analyses the effectiveness of various sports enhancing practices to enhance sports performance.
Total marks for Unit 4	100	

SUITABLE RESOURCES

Courses must be developed within the framework of the study design: the areas of study, outcome statements, and key knowledge and skills.

Some of the print resources listed in this section may be out of print. They have been included because they may still be available from libraries, bookshops and private collections.

At the time of publication the URLs (website addresses) cited were checked for accuracy and appropriateness of content. However, due to the transient nature of material placed on the web, their continuing accuracy cannot be verified. Teachers are strongly advised to prepare their own indexes of sites that are suitable and applicable to the courses they teach, and to check these addresses prior to allowing student access.

BOOKS

ACHPER 1999, *Live It Up: Books 1 and 2*, Jacaranda, Australia.

Amezdroz, G 2004, *Queensland Senior Physical Education*, 2nd edn, Macmillan, Australia

Arnheim, DD & Prentice, WE 1999, *Principles of Athletic Training*, 10th edn, McGraw-Hill, USA.

Baechle, T 2000, *Essentials of Strength Training and Conditioning*, Human Kinetics, Australia.

Bartlett, R 1996, *Introduction to Sports Biomechanics*, Routledge, UK.

Beirsdorf 1998, *Sports Injury Prevention and Management*, Coachwise, Australia.

Blair, N 2001, *Active Living Every Day: Twenty Steps to Lifelong Vitality*, Human Kinetics, Australia.

Bompa, T 1999, *Periodisation: Theory and Methodology of Training*, 4th edn, Kendell/Hunt, USA.

Boyle, M 2003, *Functional Training for Sports*, Human Kinetics, Australia.

Brehm, B 2004, *Successful Fitness Motivation Strategies*, Human Kinetics, Australia.

Brooks, D 2001, *Effective Strength Training*, Human Kinetics, Australia.

Buchanan, D 2004, *Preliminary PDHPE*, Macmillan, NSW, Australia.

Buchanan, D & Nemec, M 2003, *Macquarie Revision Guide*, Macmillan, NSW, Australia.

Burke, L 1998, *Precision Heart Rate Training – For Maximum Fitness and Performance*, Human Kinetics, Australia.

Burke, L 1995, *The Complete Guide to Food for Sport Performance*, 2nd edn, Allen & Unwin, Australia.

Burke, L & Hawley, J 1998, *Peak Performance*, Allen & Unwin, Australia.

Cardwell, G 2004, *Gold Medal Nutrition*, 3rd edn, Human Kinetics, Australia.

Carr, G 2004, *Sport Mechanics for Coaches*, 2nd edn, Human Kinetics, Australia.

Chu, D 1996, *Explosive Power and Strength*, Human Kinetics, Australia.

Clark, N 2003, *Sports Nutrition Guidebook*, 3rd edn, Human Kinetics, Australia.

Corbin, CB 2004, *Concepts of Fitness and Wellness – A comprehensive lifestyle program*, 5th edn, Human Kinetics, Australia.

Cowlin, AF 2002, *Women's Fitness Program Development*, Human Kinetics, Australia.

Davis, D et al. 2000, *VCE Physical Education: Books 1 and 2*, 3rd edn, Macmillan, Australia.

Delavier, F 2002, *Strength Training Anatomy*, Human Kinetics, Australia.

Devries, HA 1994, *Physiology of Exercise*, 5th edn, W.C. Brown, USA.

Dick, FW 2002, *Sports Training Principles*, 4th edn, A & C Black, London.

Dishman, RK et al. 2004, *Physical Activity Epidemiology*, Human Kinetics, Australia.

Earle, R & Baechle, T 2003, *Essentials of Personal Training*, NCSA, Human Kinetics, Australia.

Eshuys, J et al. 1997, *Getting It Together 1 and 2*, Universal, Australia.

Fahey, TD et al. 1994, *Fit and Well: Core Concepts and Labs in Fitness and Wellness*, Mayfield Publishing, USA.

Fitzgibbon, J 1999, *Outcomes 2: the VCE Course*, John Wiley & Sons, Australia.

Forani, B 2001, *High Performance Sports Conditioning*, Human Kinetics, Australia.

Fox, E et al. 1997, *Physiological Basis for Exercise & Sport*, 6th edn, W.C. Brown, USA.

Gaujers, R & Brown, J 2002, *Physical Education Studies Book 2 (Year 12)*, Human Kinetics, Australia.

Gore, C & Edwards, D 1992, *Australian Fitness Norms*, Health Development Foundation, Australia.

Greenberg, JS et al. 2004, *Physical Fitness and Wellness: Changing the way you look, feel and perform*, 3rd edn, Human Kinetics, Australia.

- Harmer, J & Hosford, G 1985, *Biomechanics in PE: Lab Activities – Teacher Notes and Slide Teaching*, BIPE, Australia.
- Hawley, JA 1999, *Handbook on Running*, Blackwell Science Ltd, Australia.
- Hay, JG 1993, *Biomechanics of Sport Technique*, 4th edn, Prentice Hall, USA.
- Hellison, D 2000, *Youth Development and Physical Activity*, 1st edn, Human Kinetics, Australia.
- Himberg, C et al. 2003, *Teaching Secondary Physical Education: Preparing Adolescents to Be Active for Life*, Human Kinetics, Australia.
- Hockey, RV 1996, *Physical Fitness*, 8th edn, C.V. Mosby, USA.
- Hosford, G 1993, *Sports Biomechanics*, BIPE, Australia.
- Jackson, AW et al. 2004, *Physical Activity for Health and Fitness*, Human Kinetics, Australia.
- Jamison, B 2004, *Checkpoints — VCE Physical Education Units 3 & 4*, Cambridge University Press, Australia.
- Kirk, D, Burgess-Limerick, R, Kiss, M, Lahey, J & Penney, D 2003, *Senior Physical Education*, 2nd edn, Human Kinetics, Australia.
- Kleiner, S 2001, *Power Eating*, 2nd edn, Human Kinetics, Australia.
- Lumsden, K & Jones, S 1996, *Ready to Use Secondary Physical Education Activities Program for Grades 1–6*, Prentice, USA.
- Lutgens, K & Wells, K 2001, *Kinesiology: Scientific Basis of Human Motion*, 10th edn, Saunders College, USA.
- Lynch, J 2001, *Creative Coaching*, Human Kinetics, Australia.
- MacDougall, JD et al. 1991, *Physiological Testing — High Performance Athlete*, 2nd edn, Human Kinetics, Australia.
- Magill, RA 2003, *Motor Learning — Concepts and Application*, 7th edn, W.C. Brown, USA.
- Malpelli, R et al. 1997, *Physical Education VCE Units 3 & 4*, 2nd edn, Nelson, Australia.
- Marcus, B & Forsyth, L 2003, *Motivating People to be Physically Active*, Human Kinetics, Australia.
- Marieb, E 2002, *Essentials of Human Anatomy & Physiology*, 7th edn, Benjamin Cummings, USA.
- Marieb, E 2002, *Anatomy and Physiology Colouring Workbook – Complete Study Guide*, 7th edn, Benjamin Cummings, USA.
- Martens, R 2004, *Successful Coaching*, 3rd edn, Human Kinetics, Australia.
- McArdle, W et al. 2000, *Essentials of Exercise Physiology*, 2nd edn, Lea & Febiger, USA.
- McArdle, W et al. 2001, *Exercise Physiology, Energy, Nutrition & Performance*, 5th edn, Lippincott Williams, USA.
- McArdle, W et al. 1999, *Sports & Exercise Nutrition*, Lippincott Williams, USA.
- McGinnis, P 1999, *Biomechanics of Sport and Exercise*, Human Kinetics, Australia.
- Micheli, L & Jenkins, M 1995, *Sports Medicine Bible*, Harper Collins, USA.
- Milina, RM et al. 2004, *Growth, Maturation and Physical Activity*, 2nd edn, Human Kinetics, Australia.
- Murphy, S 2004, *The Sport Psych Handbook*, Human Kinetics, Australia.
- National Health & Medical Research Council 1997, *Acting on Australia's Weight*, AGPS, Canberra.
- National Standards Commission 1996, *Measurement in Sport*, NSW, Australia.
- Nutbeam, D & Harris, E 1998, *Theory in a Nutshell: A Practitioner's Guide to Commonly used Theory Models in Health Promotion*, The National Centre for Health Promotion, Department of Public Health and Community Medicine, University of Sydney.
- Orlick, T 2000, *In Pursuit of Excellence*, 3rd edn, Human Kinetics, Australia.
- Pangrazzi, R, Beighle, A & Sidman, C 2003, *Pedometer Power*, Human Kinetics, Australia.
- Paatsch, T 2002, *VCE Study Pack Physical Education Units 3 & 4*, Australia.
- Porter, K 2003, *The Mental Athlete*, Human Kinetics, Australia.
- Powers, S & Howley, E 1994, *Exercise Physiology – Theory and its Application to Fitness and Performance*, 2nd edn, W.C. Brown, USA.
- Pyke, F (ed.) 1991, *Better Coaching: Advanced Coach's Manual*, Australian Coaching Council, Australia.
- Rowe, O & Lawrence, G 1990, *Sport and Leisure: Trends in Australian Popular Culture*, Harcourt Brace Jovanovich, USA.
- Rushall, B & Pyke, F 1990, *Training for Sport and Fitness*, Macmillan, Australia.
- Salmon, J, Telford, A & Crawford, D 2004, *The Children's Leisure Activities Study – Summary Report*, Centre for Physical Activity and Nutrition Research.
- Samman, P & Champaign, IL 1998, *Active Youth: Ideas for Implementing Centre for Disease Control Physical Activity Promotion Guidelines*, Human Kinetics, Australia.
- Schell, J & Leelarthaepin, B 1994, *Physical Fitness Assessment in Exercise and Sport Science*, 2nd edn, Leelar Biomediscience Services, Australia.
- Schmidt, R 2004, *Motor Learning and Performance*, 3rd edn, Human Kinetics, Australia.
- Sharkey, B 2002, *Fitness & Health*, 5th edn, Human Kinetics, Australia.
- Sports Medicine Australia 2000, *Drugs in Sport: A Health Professional's Handbook*, Australia.
- Sports Medicine Australia 1998, *Sports First Aid Manual*, 3rd edn, Australia.
- Standeven, J et. al. 1999, *Sport Tourism*, Human Kinetics, Australia.
- Stanton, R 1999, *Complete Book of Food & Nutrition*, Allen & Unwin, Australia.
- Stanton, R 1994, *Eating for Peak Performance*, 2nd edn, Allen & Unwin, Australia.

Stasos, A, Fedele, F, Grego, V, Eussen, A, Johnston, D & Liley, N 2001, *Sport, Lifestyle & Recreation*, Heinemann, Australia.

Steele, MK 1996, *Sideline Help – Immediate Care of Sport Injuries*, Human Kinetics, Australia.

Stone, RJ & Stone, JA 2002, *Atlas of Skeletal Muscles*, 4th edn, McGraw-Hill, Australia.

Stone, RJ & Stone, JA 1995, *Colouring Guide Anatomy and Physiology*, WC Brown, Australia.

Taggart, J 1991, *Coaching Female Athletes*, Australian Coaching Council, Australia.

The Nutrition Physical Activity Workgroup 2002, *Guidelines for Comprehensive Programs to Promote Healthy Eating and Physical Activity*, Human Kinetics, Australia.

Thompson, CW & Floyd, RT 2000, *Manual of Structural Kinesiology*, 14th edn, C.V. Mosby, USA.

US Department of Health and Human Services 1999, *Promoting Physical Activity: A Guide for Community Action*, Human Kinetics, Australia.

Welk, GJ 2002, *Physical Activity Assessment for Health Related Research*, Human Kinematics, Australia.

Willmore, J & Costill, D 2004, *Physiology of Sport and Exercise*, 3rd edn, Human Kinetics, Australia.

Zatsiosky, VM 1995, *Science and Practice of Strength Training*, Human Kinetics, USA.

JOURNALS AND PERIODICALS

Active and Healthy Magazine, ACHPER.

Active State, Sport and Recreation Victoria.

Canadian Journal of Applied Physiology, Human Kinetics.

European Journal of Sport Science, Human Kinetics.

Healthy Lifestyles Journal, ACHPER.

Inside Sport, St. Leonards, NSW.

International Journal of Sport Nutrition and Exercise Metabolism, Human Kinetics, Australia.

International Journal of Behavioural Nutrition and Physical Activity, www.IJBNPA.org

Journal of Applied Biomechanics, Human Kinetics, Australia.

Journal of Essential Sport and Exercise Psychology, Human Kinetics, Australia.

Journal of Physical Activity and Health, Human Kinetics, Australia.

Journal of Science and Medicine in Sport, Sports Medicine Australia, Belconnen, ACT.

Journal of Teaching Physical Education, Human Kinetics, Australia.

Modern Athlete and Coach, Athelstone, South Australia.

Motor Control, Human Kinetics, Australia.

Physical Activity and Health, Human Kinetics, Australia.

Pinnacle, Victorian Institute of Sport.

Runners World (Australia), Runners World Magazine, Hawthorn, Victoria.

Sports Coach, Australian Coaching Council, Belconnen, ACT.

Sporthealth, Sports Medicine Australia, Belconnen, ACT.

Sport Nutrition and Exercise Metabolism, Human Kinetics, Australia.

Sports Science Electronic Journal, www.sportsci.org

Sportsview, Vicsport, Jolimont, Victoria.

Strength and Conditioning Coach, Australian Strength and Conditioning Association, Brown Plains, QLD.

The Sport Psychologist, Human Kinetics, Australia.

Women's Fitness and Health, Blitz Publications, Mulgrave, Victoria.

VIDEOS

All Systems Go 2001, Video Education Australasia, Bendigo, Australia.

Australia – A Sporting Nation 1998, Sportsbrand Media Australasia Pty. Ltd, Video Education Australasia, Bendigo, Australia.

Base Climb 1993, Icarus Films International, ABC, Australia.

Blink and It's Gone 1995, Marcom Projects, Loganholme, Australia.

Boxing Clever 1995, Marcom Projects, Loganholme, Australia.

Body Story 3: Crash Repair 2002, Marcom Projects, Loganholme, Australia.

Coaching an Athlete 1994, FASE Productions, Learning Essentials, Clayton, Australia.

Coaching Power 1999, Marcom Projects, Loganholme, Australia.

Factors Affecting Performance Series 2003–2004, Classroom Video, Warriewood, NSW, Australia.

Fairway to Heaven 1995, Marcom Projects, Loganholme, Qld, Australia.

Hitting The Ball 2002, Classroom Video, Warriewood, NSW, Australia.

In Focus Functional Anatomy 2003, Video Education Australasia, Bendigo, Australia.

Issues in Sport (4 in the series) 1996, Karen O'Brien Media Consultancy, Video Education Australasia, Bendigo, Australia.

Motivations for an Active Lifestyle 2003, Video Education Australasia, Bendigo, Australia.

Muscle Fibre: The Link to Performance 1985, Canada Broadcasting Corporation, Video Education Australasia, Bendigo, Australia.

Pitfalls of a Sporting Life (6 in the series) 1989, Radio Netherlands TV, Video Education Australasia, Bendigo, Australia.

Principles of Training for Fitness 1999, Video Education Australasia, Bendigo, Australia.

Pushing the Limits 2001, Video Education Australasia, Bendigo, Australia.

Respiration 2000, Marcom Projects, Loganholme, QLD, Australia.

Speed for Sport and Fitness 1998, Human Kinetics Video, Australia.

Sport and Coaching 1999, Video Education Australasia, Bendigo, Australia.

Sport and Money 2000, Video Education Australasia, Bendigo, Australia.

Sport and Nutrition 2000, Video Education Australasia, Bendigo, Australia.

Sport and Psychology 1999, Video Education Australasia, Bendigo, Australia.

Sports and Science 1994, Learning Essentials, Clayton, Australia.

Sports Science Series (7 in the series) 1989, Queensland Department of Education, VEA, Bendigo, Australia.

Strike Force 1995, Marcom Projects, Loganholme, Australia.

Testing for Aerobic Fitness 1997, University of South Australia, Video Education Australasia, Bendigo, Australia.

The Australian Fitness Series (5 in the series) 1996, Video Education Australasia, Bendigo, Australia.

The Contenders. Chariots of Fire 1994, Classroom Video, Warriewood, NSW, Australia.

The Future's in the Fridge 1994, BBC Worldwide Ltd., Learning Essentials, Clayton, Australia.

The Human Body: The Ultimate Machine 1996, Great Pacific Media, Learning Essentials, Clayton, Australia.

The Human Heart 2000, Marcom Projects, Loganholme, QLD, Australia.

The Nervous System 1995, Encyclopedia Britannica, Learning Essentials, Clayton, Australia.

The Respiratory System 1995, Encyclopedia Britannica, Learning Essentials, Clayton, Australia.

The Physiology of Muscles 1987, LTS World Wide Group Ltd., Video Education Australasia, Bendigo, Australia.

The Muscles 2000, Marcom Projects, Loganholme, QLD, Australia.

The Skeleton 2000, Marcom Projects, Loganholme, QLD, Australia.

Tracking a Footballer's Movement and Skills 1999, Video Education Australasia, Bendigo.

Tracking a Netballer's Movement and Skills 1999, Video Education Australasia, Bendigo, Australia.

Training for Fitness Series 1999, Video Education Australasia, Bendigo, Australia.

Wall of Water 1995, Marcom Projects, Loganholme, QLD, Australia.

Women in Sport 2000, Video Education Australasia, Bendigo, Australia.

Women in Sports 2000, Marcom Projects, Loganholme, QLD, Australia.

Vital Systems (6 part series) 1997, Maxwell's Collection, NSW, ABC, Australia.

CD-ROMs AND SOFTWARE

ASPIRE 1999 AOC Victoria

Boulton, A & Duncan, N 1999, *Skill Acquisition* (5 IBM computer programs), Australia.

Body Systems (IBM & Macintosh) 1995, University of Western Australia.

Complete Physical Education Plans for Grades 7-12 (IBM & Macintosh) 2001, Human Kinetics, Australia.

Davis D et. al, *VCE Physical Education Book 1 & 2* (IBM & Macintosh) 2000, Macmillan, Australia.

eteaching VCE Physical Education (IBM & Macintosh) 2001, 22 Prospect Hill Crescent, Hurstbridge, 3099, Australia.

Farran, C Heart Rate Analysis (IBM & Macintosh), Heart Zone Training Company, Deepdene, Vic Australia.

Food Works, XYRIS Nutrition Australia.

FoodScan 98 (IBM & Macintosh) 1998 Andromedia Educational Software, Melbourne, Australia.

Human Biology Discovery 2002, Marcom Projects, Loganholme, Qld, Australia.

Snapper, Webbsoft Solutions www.webbsoft.biz

Sports Search, AIS.

Swinger, Webbsoft Solutions.

Vernier, C 2003, *Logger Pro 3* (IBM & Macintosh), Vernier Software & Technology, Oregon, USA.

World of Sport Examined (IBM) 1997, Granada Learning, Manchester, England.

WEBSITES

Australian Bureau of Statistics
www.abs.gov.au

Australian Physiotherapy Association
www.physiotherapy.asn.au

Australian Sports Commission
www.ausport.gov.au

Australian Sports Drug Agency
www.asda.org.au

BEACHES
www-rohan.sdsu.edu/faculty/sallis/BEACHES.pdf

Body Systems
www.bbc.co.uk/science/humanbody
www.science.howstuffworks.com
www.innerbody.com
www.ehc.com/vbody.asp

Centre for Disease Control
www.cdc.gov

Energy Systems
www.brianmac.demon.co.uk/energy.htm

Exercise Physiology
www.nismat.org/physcor/index.html

Muscles
www.ptcentral.com/muscles/

National Centre for Chronic Disease
www.cdc.gov/nccdphp

National Institute of Health and Welfare
www.aihw.gov.au

National Physical Activity Guidelines
www.health.gov.au/internet/wcms/publishing.nsf/content/home

National Physical Activity Initiatives
www.healthyactive.gov.au

National Public Health Partnership
www.nphp.gov.au

Physical Activity Questionnaires
www.ipaq.ki.se
www.aihw.gov.au/publications/index.cfm/title/8559

Respiratory System
www.lung.ca/children/index_kids.html

Runners World
www.runnersworld.com

Self Efficacy
www.emory.edu/EDUCATION/mfp/self-efficacy.html

Smartplay initiative
www.smartplay.net

SOFIT
<http://socialmarketing-nutrition.ucdavis.edu/Tools/Downloads/sofitprotocol.pdf>

Stages of Change
www.cdc.gov/nccdphp/dnpa/physical/starting/
www.psychcentral.com/library/alcohol_stages.htm
www.engenderhealth.org/res/onc/sti/preventing/sti6p2.html
 (Although latter two websites relate the Stages of Change model to other health issues, the information on the structure of the model is very useful and can be directly related to physical activity.)

Sports Science articles
www.sportsci.org/

ORGANISATIONS

Anti-Cancer Council
www.accv.org.au

ACHPER Victorian Branch Inc.
www.achper.vic.edu.au
 (provides links to sporting organisations)

Australian Nutrition Foundation
www.nutritionaustralia.org/

Australian Sports Commission
www.ausport.gov.au/asc/

Bicycle Victoria
www.bv.com.au

CSIRO Health Sciences and Nutrition
www.dhn.csiro.au

Department of Health and Aging
www.health.gov.au

Diabetes Australia (Vic)
www.dav.org.au

Fitness Australia
www.activeforlife.com.au

Healthy Eating Healthy Living Program
 Healthy Eating Club Pty Ltd
www.healthyeatingclub.com/

Sport and Recreation Victoria
www.sport.vic.gov.au

Sport Education Victoria
www.vis.org.au/sported

Sport Medicine Australia
www.smasa.asn.au

Victorian Disabled Sports Advisory Committee
home.vicnet.net.au/~vdsac

VICFIT
www.vicfit.com.au

Victorian Health Promotion Foundation
www.vichealth.vic.gov.au

Victorian Olympic Council
www.olympics.com.au

VicSport
www.vicsport.asn.au

Womensport and Recreation Victoria
www.womensport.com.au